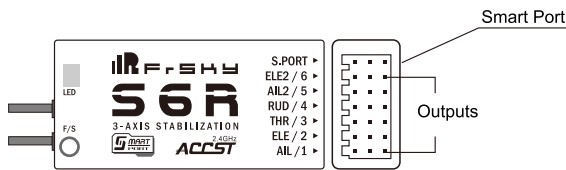
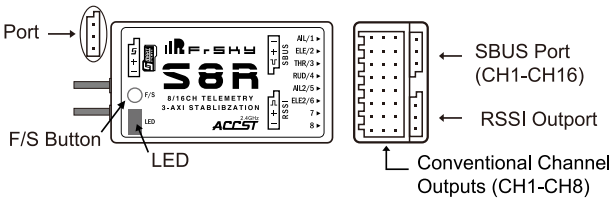


## Overview



Green LED	Red LED	Status
ON	Flashing	Binding
Flashing	OFF	Normal
OFF	Flashing	Signal lost

Yellow LED	Status
ON	Accelerometer outside of Calibration limits[0.9 G , 1.1 G]
OFF	Accelerometer within Calibration limits [0.9 G , 1.1 G]
Flashing	Completed accelerometer calibration

Blue LED	Status
ON	Self-check in progress
OFF	Completed self-check

## Specifications

Model name: S6R (6CH receiver with built-in 3-axis gyro and 3-axis acceleration)  
 47.42×23.84×14.7mmmm (L × W × H)  
 S8R (8CH/16CH receiver with built-in 3-axis gyro and 3-axis acceleration)  
 46.47×26.78×14.12mmmm (L × W × H)  
 Weight: S6R 12.1g ; S8R 14g  
 Number of Channels: S6R 6CH (1~6CH from conventional channel outputs)  
 S8R 16CH (1~8ch from conventional channel outputs, 1~16ch from SBUS port)  
 Operating Current: S6R 100mA@5V ; S8R 120mA@5V  
 With RSSI PWM output on board (S8R only): PWM voltage output(0~3.3V), 100HZ, 1500±500us  
 Operating Voltage Range: 4.0~10V  
 Operating Range: full range  
 Gyroscope Measurement Range: ±2000dps  
 Accelerometer Measurement Range: ±4g  
 Firmware Upgradeable  
 Compatibility:  
 FrSky Taranis X9D Plus/X9E/Horus X12S /XJT in D16 mode  
 S6R-EU/S8R-EU only works with FrSky Horus X12S and Taranis X9D Plus/X9E/X7/XJT in D16-EU mode.

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## Features

- Built-in three-axis gyroscope and three-axis accelerometer sensor module
- Built-in RSSI PWM output (0~3.3V) (S8R only)
- Built-in battery voltage detection.
- Smart Port enabled

## Receiver Channels

Receiver channel order:  
 AIL1 (CH1), ELE1 (CH2), THR (CH3), RUD (CH4), AIL2 (CH5), ELE2 (CH6), \*7(CH7), 8(CH8), gyro gain adjustment (CH9), flight modes (CH10 and CH11), self-check activation switch (CH12).

## Function:

AIL1 (Aileron nr.1), ELE (Elevator (nr.1)), THR (Throttle), RUD (Rudder), AIL2 (Aileron nr.2) and ELE2 (Elevator nr.2), \*7, 8 should be connected to the corresponding servos.

S.PORT can be used to update, edit parameter settings via the FrSky STK PC tool and to connect telemetry sensors.

\*only S8R has 7(CH7) and 8 (CH8).

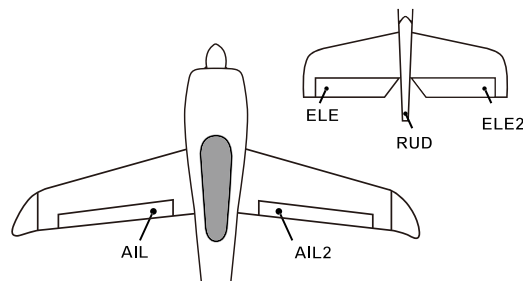
For S8R, 1~16CH can output from SBUS port. RSSI PWM (0~3.3V) can output from RSSI port.

## Functions

The S6R/S8R supports stabilization, automatic level, hover and Knife-edge flight modes for conventional models, stabilization and automatic level for Delta wing (flying wing) and V-tail. These model types can be enabled via the S6R/S8R.Config or S6R/S8R.lua. If required the S6R/S8R can be used as a standard 6/8 channel X series receiver.

\*S8R can be also used as 16 channels X series receiver when SBUS used.

## Conventional model layout



S6R/S8R supports stabilization, automatic level, hover, Knife-edge and an off function when selecting a conventional model layout. The available flight modes can be set assigned to channels CH10 and CH11, in combination with three position switches as shown below:

Flight mode	Stabilization	Automatic level	Hover	Knife-Edge	Off
CH10 (3 pos SW)	CH10>M+H (CH10 SW Down)	CH10>M+H (CH10 SW Down)	CH10>M+H (CH10 SW Down)	CH10<M-H (CH10 SW Up)	CH10 SW-mid
CH11(3 pos SW)	M-H<CH11<M+H (CH11 SW Mid)	CH11>M+H (CH11 SW Down)	CH11<M-H (CH11 SW Up)	M-H<CH11<M+H (CH11 SW Mid)	

M=1500us represents a neutral signal, H=50us represents the required signal change to activate the mode. When using the factory settings the switch position shown above represents the mode selection.

**Off mode:** When active the S6R/S8R processes the received commands from the transmitter and acts on the plane without compensating.

**Stabilization mode:** When active the S6R/S8R compensates outside forces instantly and compensates during orders from the transmitter using the data from the three-axis gyroscope. This to enhance the stability on all three axes of the model (Pitch-Roll-Yaw), thereby improving the stability by reacting to wind generated forces encountered by the model. CH9 can be used to adjust gyro gain by assigning a knob or slider (gain = abs (CH9-M)), this will change the sensitivity of the counteracting signal produced by the internal three-axis gyroscope.

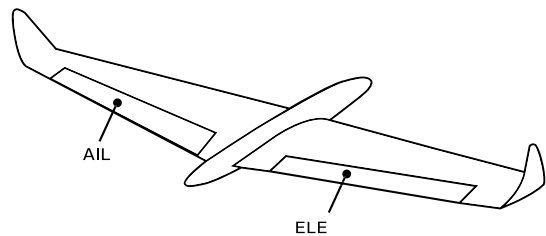
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**Automatic level mode:** S6R/S8R uses the internal three-axis accelerometer and the three-axis gyroscope on the AIL and ELE channels, to return the model to level orientation when the sticks are released to neutral. The RUD channel will operate in stabilization mode only.  
**Hover mode:** When active the S6R/S8R uses the internal three-axis accelerometer and the three-axis gyroscope on the ELE and RUD channels, to point the nose straight up. While in this mode the user can control the rotation of the model with AIL, THR is used to adjust the altitude. ELE and RUD inputs (by user) are not required in this mode as the S6R/S8R will hold the nose pointing up. The AIL channel will operate in stabilization mode only.  
**Knife-edge mode:** When active the S6R/S8R uses the internal three-axis accelerometer and the three-axis gyroscope on the AIL and RUD channels, to roll the plane on its side (wing points up). While this mode steering is done with ELE, and altitude can be maintained with THR and/or RUD. AIL inputs (by user) are not required in this mode as the S6R/S8R will hold the wing pointing up. The ELE channel will operate in stabilization mode only.

## Delta wing (flying wing)



When using the Delta wing (flying wing) type option, the signal produced by the transmitter should be without active mixes on the AIL and ELE channels. The S6R/S8R will mix the AIL (CH1) and ELE (CH2) input signal with a fixed mix percentage automatically. The RUD(CH4), AIL2 (CH5), ELE2 (CH6), \*7(CH7), 8(CH8) signals can behave as required by the user. The S6R/S8R supports stabilization, auto level and off modes when using Delta wing (flying wing). CH9 can be used to adjust gyro gain by assigning a knob or slider, this will change the sensitivity of the counteracting signal produced by the internal three-axis gyroscope.

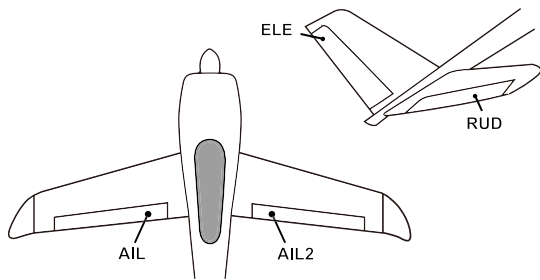
\*Only S8R have 7(CH7), 8 (CH8).

Three different flight modes can be selected by using channel CH10 in combination with a three position switch as shown below:

Flight mode	Stabilization	Auto Level	Off
CH10	CH10>M+H (CH10 SW Down)	CH10<M-H (CH10 SW Up)	CH10 SW center

M=1500us represents a neutral signal, H=50us represents the required signal change to activate the mode. When using the factory settings the switch position shown above represents the mode selection.

## V-tail



When using the V-tail type option, the signal produced by the transmitter should be without active mixes on the ELE and RUD channels (rates/expo are allowed). The S6R/S8R will mix the RUD (CH4) and ELE (CH2) input signal with a fixed mix percentage automatically. AIL1 (CH1), AIL2 (CH5), ELE2 (CH6), \*7 (CH7), 8 (CH8) signals can behave as required by the user. The S6R/S8R supports stabilization, auto level and off modes when using V-tail. CH9 can be used to adjust gyro gain by assigning a knob or slider, this will change the sensitivity of the counteracting signal produced by the internal three-axis gyroscope.

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\*Only S8R have 7(CH7), 8 (CH8).

Three different flight modes can be selected by using channel CH10 in combination with a three position switch as shown below:

Flight mode	Stabilization	Auto Level	Off
CH10	CH10>M+H (CH10 SW Down)	CH10<M-H (CH10 SW Up)	CH10 SW center

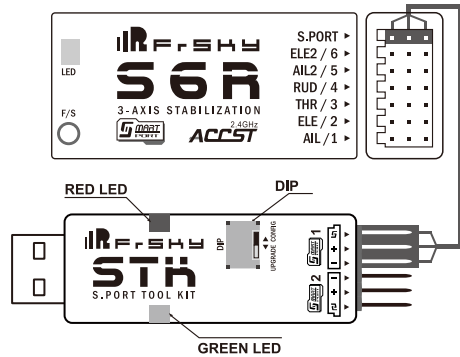
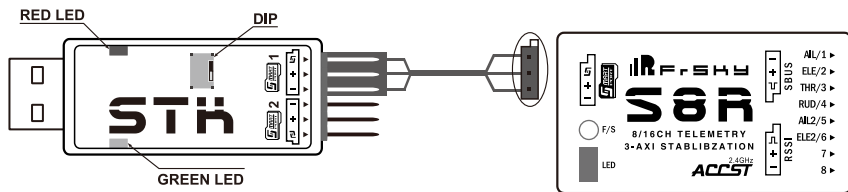
M=1500us represents a neutral signal, H=50us represents the required signal change to activate the mode. When using TX factory settings the switch position shown above represents the mode selection.

## Configuration

Use either a FrSky radio (wireless) or the PC configuration software (FrSky STK (usb adapter)) to configure the S6R/S8R settings, these are: wing type, mounting type, gain setting, offset angle setting and accelerometer calibration. When using a FrSky transmitter running OpenTX, make sure the transmitter has firmware version 2.2 or above installed. Copy the S6R/S8R .lua file on the SD card of the transmitter, bind the S6R/S8R to the transmitter and run the file.

## Using the PC configuration software

Connect the S6R / S8R as shown below to the FrSky STK usb adapter, and plug it in to a PC.



Run the S6RConfig / S8RConfig software to access the page illustrated below. Press

“open” to connect with the S6R/S8R. On the bottom of the menu screens the following options are displayed:

**Serial:** Displays the usb port that has the S6R/S8R is connected.

**S6R/S8R enabled:** When S6R/S8R enable check box in not marked, the S6R/S8R functions as a regular six channel receiver.

**Open:** Gives the PC software access to the S6R/S8R configuration data.

**Read:** Retrieves the stored S6R/S8R data to be edited in the PC software.

**Write:** Stores the created data on the S6R/S8R.

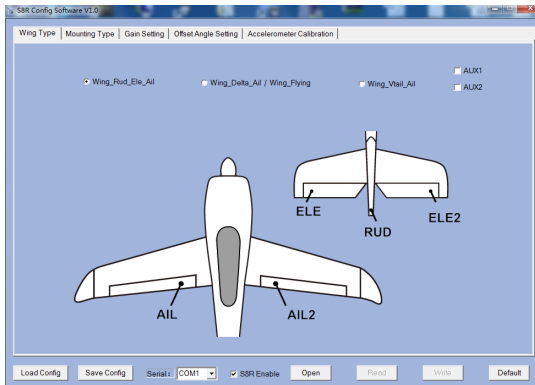
**Default:** Returns the PC software settings to the factory defaults.

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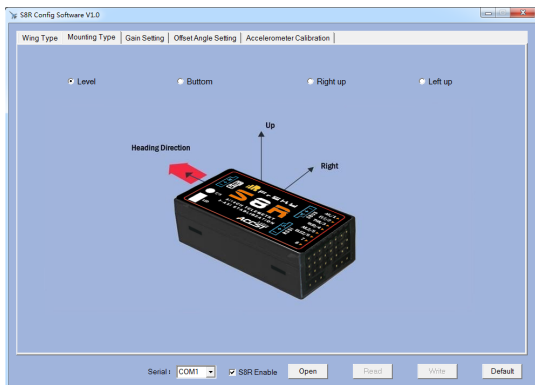
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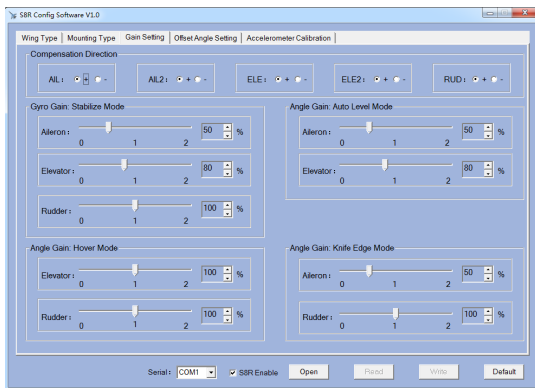
## With the S8R as an example



Wing type



Mounting type



Gain setting

### Wing type

Conventional model, Delta wing (flying wing) and V-tail options are available. If AUX1 is selected, ch5 will be no AIL2 function. If AUX2 is selected, ch6 will be no ELE2 function. Button of "Svae Config" can save all the settings to one file. Button of "Load Config" can restore the settings from the file you saved before.

### Mounting type:

level, Bottom, Right up and Left up options are available.

**Compensation direction:** The S8R AIL, AIL2, ELE, ELE2, RUD travel direction can be reversed by selecting the positive or negative option for each channel.

**Gyro gain stabilize mode:** The gain setting of the S8R stabilize mode can be set on the aileron, elevator and rudder channels.

**Angle gain Auto level mode:** The gain setting of the S8R Auto level mode can be set on the aileron and elevator channels.

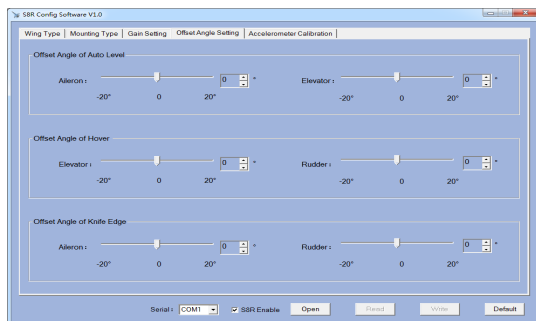
**Angle gain Hover mode:** The gain setting of the S8R Hover mode can be set on the elevator and rudder channels.

**Angle gain Knife Edge mode:** The gain setting of the S8R Knife Edge mode can be set on the aileron and rudder channels.

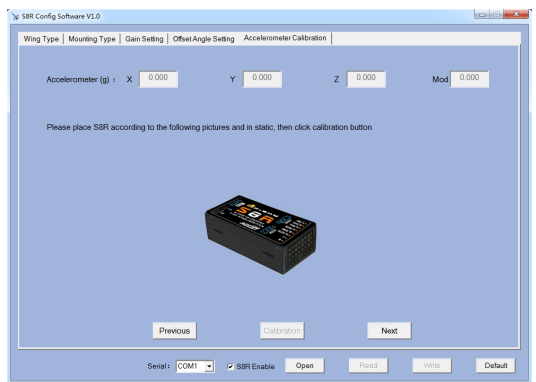
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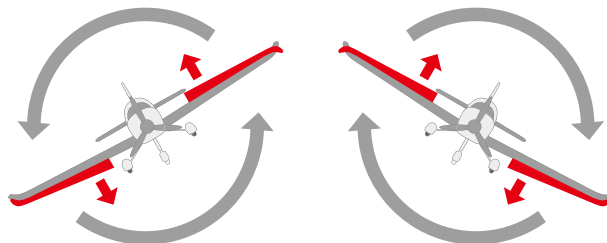
Offset angle setting



Accelerometer calibration

### Inspection of direction

We recommend to check the compensation direction of S8R signal before each flight to insure flight safety. Auto level mode produces an large deflection on the AIL and ELE channel and makes it ideal for checking the aileron and elevator surfaces, selecting Knife edge or hover gives the user clear view of the rudder surface.

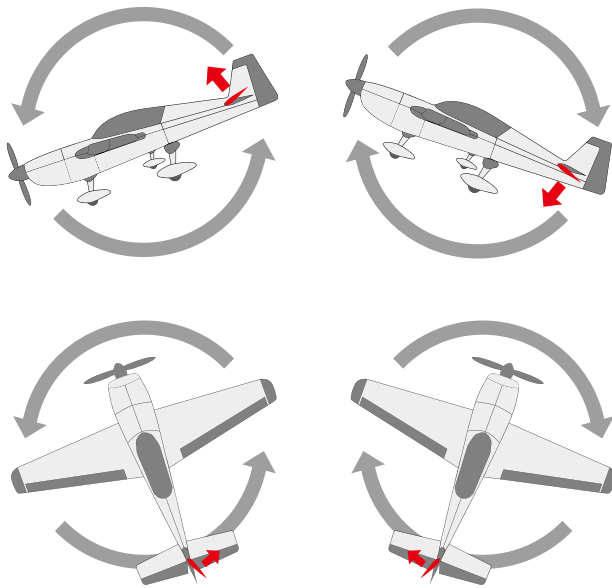


When the plane is rotated left or right (Roll), ailerons should have the correcting actions as illustrated above.

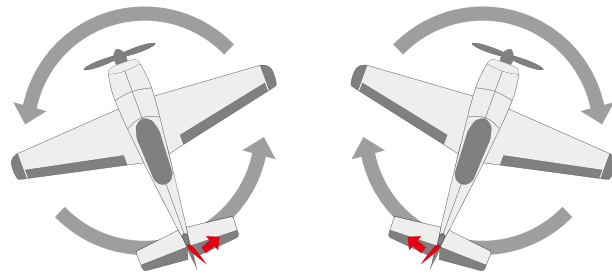
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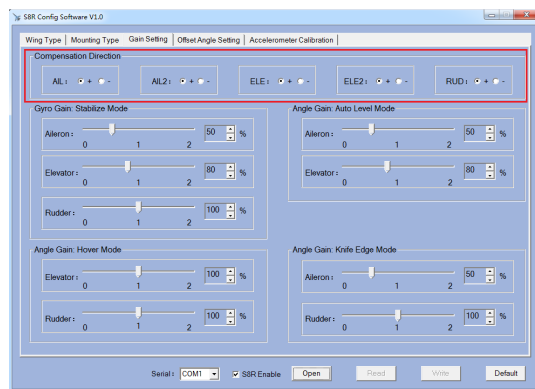


When the plane is rotated up or down (Pitch), elevators should have the correcting actions as illustrated above.



When the plane is rotated to left or right (Yaw), rudders should have the correcting actions as illustrated above.

If the compensation direction is incorrect, reverse the affected channel via the PC software as illustrated below.



After changing the compensation direction, make sure to check it again on the actual model.

### Self-check

Before starting the self-check, place the model on the ground (level surface).

When flying models, aerodynamic balance is more important than a level model attitude. This results in that at slow speeds the model fly's at a constant altitude with the nose pointing slightly up. To avoid the plane nose-diving at high air speeds the user must insure that the model is placed at a level or slightly nose up attitude during the self-check. Always install the S6R/S8R straight and level in the model, if required the PC software can be used to adjust the angle of attack to produce the required setting. If large values are required, we advise the user to recheck the installation orientation of the S6R/S8R.

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Power the transmitter and insure that the Aileron (CH1), Elevator (CH2), Rudder (CH4), Aileron2 (CH5) and Elevator2 (CH6) are in the neutral position. Power the model to start the S6R/S8R self-check, this is required to attain the gyro auto level angle and gimbal neutral position. Do not touch and/or move the model until the self-check is finished, as this will corrupt the calibration settings created during the procedure.

By press and releasing the bind button of the S6R/S8R or by change (if set up in the transmitter) the switch position of CH12 pass through midpoint 3 times in 3 seconds will trigger the self-check procedure, the blue LED will turn ON to indicate self-check procedure is initiated, the surfaces will move and thereafter the blue LED turn off to indicate the self-check has been completed. NEVER operate the CH12 switch during flight! During the self-check procedure, transmitter inputs will not be reproduced by the S6R / S8R. Operating CH12 during flight will trigger self-check, an results in crash of the model. After completion, move the sticks from CH1 to CH6(except Thr) to transmit the channel limits to insure the output of S6R/S8R will not damage the models hardware. The S6R/S8R will save the zero points of the gyro, auto level angle, gimbal neutral position and servo channel limits. Remove the S6R/S8R power supply and retry if self-check fails.

### setup steps

#### S6R/S8R setup steps

1. Use the pc software to calibrate the S6R/S8R before installing it in to the model. Insure the wing type and mounting orientation settings are identical to the intended model installation.
2. Power the transmitter and reduce the servo endpoint setting to insure self-check mode cannot damage the models hardware.
3. Assign a knob or slider to operate CH9, this will activate the real-time gain adjustment capabilities of the S6R/S8R.
4. Assign three-position switches to operate CH10 and CH11, this to switch between the available flight modes.
5. Power the model and check the deflection direction of each control surface to insure this is correct Switch between the flight modes and insure that the compensation direction of the gyro is as intended on RUD, AIL and ELE.
6. If necessary, you can make a self-checking for S6R/S8R. Disconnect the power from the S6R/S8R will not lose the setting parameters.

Enjoy flying.

FrSky is continuously adding features and improvements to our products. To get the most from your products, please pay attention to FrSky website [www.frsky-rc.com](http://www.frsky-rc.com), download section for the latest update firmware and how-to guide.

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